This
Thesis submitted for
the degree of Doctor of Medicine
1892.

by Jno. W. Parke M.B., C. S.

10, Henshaw Head St. Southport
Lancashire
New Zealand as a Sanatorium

For the invalid from Pulmonary disease
or constitutionally weak.

Being a description of New Zealand from a 
medical point of view; with remarks as to the most suitable parts for the 
above to reside in; the parts to avoid &

A comparison of the Vital Statistics
of the Australian Colonies & Great Britain

by

Jno. W. Pare M.B., F.C.M.
Works used as reference

Statistics of the Colony of New Zealand 1889

1890

Report of the Statistics of New Zealand 1889

Description of book for Pilots of New Zealand

Handbook of New Zealand

Sir James Hector

Official Records of Tasmania

Yearbook of New South Wales

Victorian Yearbook

Statistical South Australia

New South Wales 1859
History & geographical position of New Zealand.

New Zealand when first discovered was inhabited by the Maori race, of whom some 40,000 still remain. The discovery was made in 1642 by Abel Tasman, a Dutchman, who also discovered Tasmania in the same year. Tasman did not land on any part of New Zealand, owing to one of his boatscrew being off best merely sailed along the coast of the North Island.

New Zealand was next visited by Captain Cook in the year 1770 and annexed to Great Britain. He had on board a boy from Tahiti who was able to converse with the natives (Maories) whose language proved to be almost identical with his, soon proving that the two races had a common origin. This is supported by Maori legend.

New Zealand is made up of three islands (a) North Island (b) South Island (sometimes called Middle) and (c) Stewart's Island. It is situated between the parallels of 34° 25' and 47° 17' South latitude. The North and South Islands are by far the largest, Stewart Island being only 120 miles in circumference, occupying nearly the same space. The Coast Line of New Zealand is nearly 3,000 miles in extent. The area of the country amounts to nearly 102,000 sq. miles. The islands of New Zealand are shaped so as to resemble the leg and foot of a man with the toe pointing to the equator. Great Britain is situated between the
Parallels of 50° and 58½° North latitude. The northernmost part of Scotland is therefore 11½° farther from the equator than the most southern part of New Zealand. Lat. 47°17'S. is the road 670 miles and the most southern part of Great Britain is 15½° farther from the equator than the most northern part of New Zealand or 940 miles.

The North Island

The area of the North Island is nearly ¾ of England. Wales has numerous warm valley valleys, many well wooded, alternating with forest-clad hills. There is a mountain range running down the island from the N.W. to S.E. but not so regular or broken as that in the South Island. This range divides the island into two plains, the larger one being on the West. Rainy, hilly, the most ornamental plantation, best vegetables, fruits grow to great perfection. The orange, lemon, grapefruit, olive and mulberry are cultivated with great success in the open air.

The most remarkable natural feature of the North Island is the numerous hot springs, geysers (both natural and man-made) and mud baths of which there are hundreds and extend from Tongariro, south of Lake Taupo, northward a distance of nearly 300 miles and about 30 miles wide. Clumps of
Sulphurous Steam are seen rising all over this extensive area. On Tongariro a mountain 7,515 ft above the sea level steam continually hovers; this mountain was in action within a fortnight before she sent up clouds of dust, smoke, steam &c. The healing properties of these hot springs for cutaneous affections & rheumatism were so well proved that the New Zealand Government have bought the country around Lake Rotomahana for a public sanatorium. Bythorne & Harrison &c. The hospital has been erected by Government & a doctor has been appointed to look after the patients.

The temperature of the hot springs varies from 60° to 212° F. Analyses of the waters have been made in the Colonial Laboratory and including other mineral waters in New Zealand they have been grouped as Sulphuric, Alkaline, Alkaline-silicious, Hepatic, a Sulphurous, and Acidic.

Vide Dr. Lander's Report.

The Middle Island

This is the largest of the group its area equals that of England & Wales. Its climate resembles England excepting that there is less winter. Running down the island there is a chain of mountains called the Southern Alps near the coast lesser than the coast of bright Grandian equal.
To the chief European one, capped with eternal snows and covered with
intervening valleys filled with mighty glaciers. The extreme length is about 325 miles and the extreme width
180 miles. The mountains are very high, Mount Cook reaching
12,349 ft., the western sides being more abrupt. All the glaciers
descend to within 700 ft. of the sea level. Both the eastern and
western sides are forested.

Dusky cedars and pines penetrate the mountains abutting on
the south-western coast from the sea. They are long narrow, some of
them having very great depth of water. They are surrounded by snow-
capped mountains rising precipitously to 5,000 ft. and 12,000 ft.
above the sea. The scenery is sublime.

The mountains near more or less from S.E. to N.W. with the north
they are more scattered having beautiful valleys rather than
as for instance in the Provincial District of Nelson. But farther
west toward the south of the island they are more defined. Vision
together. In the middle of the island is the Red District of Canterbury
which is almost entirely a plain hence the name “Canterbury Plain”.
The southern part is more mountainous and has many
fine plains and valleys. In this District are the “Cold Lakes”.

Stewart Island

This island is mountainous in character chiefly covered with
forest; it is an excellent summer resort being cool during
September to October and again.
Climate

New Zealand, as before stated, is situated between the parallels of 34° 25' S. and 47° 17' S. latitude, the corresponding latitudes of the Northern Hemisphere extend from Central France, over Italy and Sicily into Northern Africa. The climate of New Zealand, from its insular position (not part inland being more than 80 miles from the sea) is more equable than in those countries; from the same cause it is colder in summer. It is more equable than the climate of Great Britain, although it somewhat resembles it, that is, it never has a very high summer heat, but it also never like Great Britain has a low temperature in winter. The extremes of daily temperature only varying throughout the year by an average of 20° F., whilst in London it is 7° colder than the North Island.

Middle

The mean annual temperature of the North Island is 57° F.

South 52°

Newport, London, is 51°.


The whole Colony of the different seasons is in Spring 63° F., Summer 68° F., Autumn 57° F., Winter 48° F.
The climate resembles that of Great Britain as a whole, but as before stated, that of the climate of some parts of New Zealand differ very much from each other. The climate of the North Island differs from that of the South Island. In the North Island snow is never seen except on the mountain range 3,700 ft. upwards high. The rainfall (computed by noting the amount at 4 different places of observation on each island similarly situated) is greater in the South Island than the North. The rainfall is greater on the West coast than in the East in both islands; the difference is very marked in the case of the South Island. In the latter Island the rainfall of the East & West is
Church in 25.3.36 in for the year 1889, in Hobart on the West the rainfall is 11.65.3 inches. The mean annual rainfall of the North Island is 47.85.2 in, of the South Island 53.40.5. Westerly Winds prevail over New Zealand.

Comparison of Rainfall in North & South Islands

<table>
<thead>
<tr>
<th>Location</th>
<th>North Island</th>
<th>South Island</th>
</tr>
</thead>
<tbody>
<tr>
<td>Auckland</td>
<td>43.98.9</td>
<td>112.15.6</td>
</tr>
<tr>
<td>Taranaki</td>
<td>58.08.4</td>
<td>25.77.6</td>
</tr>
<tr>
<td>Nelson</td>
<td>57.26.0</td>
<td>32.01.9</td>
</tr>
<tr>
<td>Wellington</td>
<td>50.78.1</td>
<td>43.67.4</td>
</tr>
</tbody>
</table>

The above figures are the means of 19 years.
The Northern part of New Zealand is within the influence of the 
southwesterly winter rainfall. In the South, the rainfall 
throughout the year is distributed more equally over the 
year. On the North coast, spring rains prevail

East, summer

South, it is in winter prevailing

In the middle of the colony, the driest season is autumn.

Points of lasting drought are almost unknown, the being two cases
on record only where it lasted a whole month. The greatest day's rainfall
recorded was at Auckland 6½ in. and Nelson in the Sea
South Island 9½ in.

Peaking generally the atmosphere is moister for the whole
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
the trade to a minimum of 32°18' F. This district has a
reputation in New Zealand for the cure of respiratory
and tubercular diseases. The highest daily range of temp. 21.7°.
Suffice it to say that the East Coast of the North Island

Taranaki.

It is situated on the West of the North Island in a
very healthy part of the North Island, New Zealand. It is for
the most part a plain, the climate is mild and agreeable.
There is never any snow. The hottest days are moderated
by sea breezes. Mr. W. H. S. S. (Aberfield) describes the climate
as similar to Southern Spain.

86° F. 30° F. 21° F.

The rainfall is nearly double that of Rotorua in the
most part, and double that of Christchurch; it is 37° 44.2 in.
The summer temp. is about 64° F. the winter 49° F.

Wellington.

This Provincial District is situated in the South &
Southwest of the North Island, for the most part
mountainous in the S.E. part of it, but a plain in the
westerly part of it. The climate of this district is of
two kinds, (a) the Westerly resembles Taranaki but
(b) the Southwesterly has a climate peculiar to itself.
it is very windy oftener it blows with hurricane force. The S.E. wind is usually cold & damp & blows with great force. I cannot conceive of a nicer atmosphere than this district has when it is calm. In the year 1889 there were no less than 77 days of gales of high wind.

The following figures express conjoining rain fall etc.

35°3 80° F. 31°5 F. 19°50 E.

Total Rainfall 31.866 in. Max Days 185. Max Days rain 1.5 win

In one day only was there a slight fall of rain: 2 days of hail, 8 days of fog, and 6 days in which slight shocks of earthquake were felt. This district on account of the cold land wind is unsuitable forearing of respiring a territorial vision.

The Western portion of the Wellington Prov. Dist. has a climate similar to Taranaki.

Nelson

This Prov. District is situated on the North & South East of the South Island. The first part shall describe under this heading the second part under Notitia as their conditions are almost identical.

The Northern portion of this district is mountainous and as placed so to shelter the beautiful valleys & plains below from the W. N. S. & S.E. winds which are cold & for New Zealand, severe & harsh. The capital of this district "Nelson" is called "Sleepy Hollow" from its
Beautiful balmy air, its quietude, its mild equable climate. Snow seldom falls & when it does it has dissolved by 10 o'clock am.

34° 86 82° 04 27° 32 23° 40

Rainfall 61. 579 in. Max. day's rain 7. 189 in. This amount is extremely exceptional.

Ponson also has a reputation in New Zealand for remedying Tubercular Disease. I am informed that of the five medical men that four voted in account of chest complaint.

In my opinion however it is not so good a place than Nelson because the latter is drier having only half its rainfall.

Hokitika

This town is situated on the West Coast of the South Island in the Provincial District of Westland & is considered the climate of it we are considering the climate of the whole of Westland & the E.n. part of Nelson.

This district is placed to the west of the Southern Alps & when it is said the greatest rainfall of the whole of New Zealand. It is remarkably equable in temperature that the air is very moist. The climate here is more equable.
than any other part of the South Island and much more so than Christ Church situated on the East Coast:

52°34' 74°12' 28°22' 15°66
Average Daily Range Winter Temp. 4°5°5 Summer 19°2
13°14° Rainfall 122 inch, this is an average of 12 years.
This district I think is unsuitable for Allommetry.
Each Disease. The extreme range of temp. is 35°90
being about half that of Canterbury, Otago & Southland.

Canterbury, Marlborough

Marlborough Provincial District resembles the part described under Nelson excepting that the rainfall is less & the air is dry. It is situated in the North East of the South Island.

Canterbury Provincial District is situated in the South Island & is bounded on the North by the Nelson P. D. 7
the South by the Otago P. D. on the West by the
Southern Alps & on the East by the South Pacific
Ocean. It is almost entirely a plain.
The climate is changeable owing to a local wind (W.N.W.)
being hot vary relaxing. Have been off the coast
Here is where it has felt quite cold. I had to wear an overcoat. Within 10 minutes there has blown this N.W. wind that
cold, &
	relaxing compelling to me to take the coat off.
On the other hand the cold South, South
	East, South West winds blowing over the plains
	from which there is no natural protection.
The rainfall is light & the summers are dry, but
there are no droughts like those of Australia

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>8°16</td>
<td>22°00</td>
<td>19°08</td>
<td></td>
</tr>
</tbody>
</table>

The extreme range is 68°.

<table>
<thead>
<tr>
<th></th>
<th></th>
<th>Summer Temp.</th>
<th>Winter Temp.</th>
</tr>
</thead>
<tbody>
<tr>
<td>17°10</td>
<td></td>
<td>61°32°E</td>
<td>38°5</td>
</tr>
</tbody>
</table>

Rainfall 25.636 in. Monday rain 1.622

Snow occasionally falls but has all disappeared
by noon. If being flat, there is a heavy dew
night. Foggy days are not unfrequent in the win-
ter.

I should not recommend patients with respiratory dis-
ase, or chronic to emigrate to this part of New Zealand.

Stilt it is preferable to Great Britain.

Otago

This Provincial District is placed to the South
of Canterbury, to the East of the Southern Alps.
to the north of Southland is bounded on the east by the Southern Pacific.

51.1   86.0  24.0  16.20

Mean Daily Range  Extreme Range 62.0
13.68  Summer Temp. 57.20 Winter Temp. 43.5


Otago ranks second to Canterbury for small rainfall but where the air is brumid. The mean humidity of the year was 79.100 = complete saturation. The humidity was greater than that of any other Provincial District including Auckland. In winter the air is cool and damp with cold raw winds from the S.E. Towards fog, hail, snow are not uncommon. Altogether I found that this is a very comfortable spot to send patients with pulmonary disease or rheumatism. But it is a fact that cases of phthisic or nervous asthma are much bettered here. I know one gentleman personally who has a big lump of several thousand acres in the Haringhinahi District of Wellington Provincial District who goes down to the cold lakes of Otago during the New Zealand summer where he gains relief.
Southland

This Provincial District is situated in the South West part of New Zealand.

50.36 83.84 20.12 22.68

Mean Daily Range Summer Temp. Winter Temp.
20.16 57°10 42°26

Rainfall 49.72 in. Max. Depression 1120 in.

In this District it is cold. Varying to feverish chest complaints (causing dyspeptic action). It extends to the South, South East & South West winds in all their harshness & severity. The air in winter is often cold even there is frequently fog, hail & snow the latter of which remains on the ground for some time. There is no beneficent Gulf Stream bathing its shores & the northerly winds blowing over the snowy mountains of the Southern Alps. The Cold Lakes of the Alps are deprived of a good deal of their warmth. Consider this the worst part of New Zealand beyond Submarine & Subterranean Patients to. On my first voyage to New Zealand I had under my charge in the Hospital a diverse company from the neighbourhood of London who were suffering pretty advanced phthisis who was going
out to the South of New Zealand a place totally un
fit for him. The South of England would have suited
him much better because it is sheltered from the
northerly winds & the southerly are beneficial
not so in Southland New Zealand. Then again
the South of England has the Gulf Stream to battle
its shores. It was this case principally that
led me to think of work out that subject of their
than.

Hot Lake District

This district is situated in the North Island between
from the South of Lake Taupō the most southeasterly
of the Auckland Pro. District to the Bay of Islands in the
north of this same district being about 150 miles long.

Although there are hot springs containing minerals all over this
district yet three springs only are used extensively by the inviolate
they are (1) Bay of Islands (2) Te Aroha in the Thames District
(3) Rotow̄a.

1) Bay of Islands

This is situated on the eastern shore of the most southeasterly
part of Auckland Pro. District. The climate is subtropical, warm &
moist, but being in a long narrow peninsula it is modified
greatly by the sea breezes. There is no winter, the latter is replaced by a slight rainy season.

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>59°.90 F</td>
<td>89°.10 F</td>
<td>31°.82 F</td>
<td>19°.08 F</td>
</tr>
</tbody>
</table>

Mean daily range, highest early in the morning. Rainfall 58.132 in.

10° 57° Max. Dep. rain 3.5 in.

Phaeacian or Pahuraha are a group of springs a few miles south of the Bay of Islands, varying in temperature from 60°-116° F and contain 16 parts to the liter. They are acidic, depositing albumin and calcite in cooling. There is an escape of mercuric sulphide, which deposits cinnabar and metallic mercury. They are chiefly used in their disease having a specific action. Waipuna, situated on the coast further south near Auckland, is a weakly and alkaline saline spring used extensively as baths for rheumatic and digestive complaints partially as a mild antacid. The temperature is 110° F and contains 17.7 parts to the liter. It is alkaline saline.

<table>
<thead>
<tr>
<th>Chloride of Sodium</th>
<th>116.715</th>
</tr>
</thead>
<tbody>
<tr>
<td>Potassium</td>
<td>109.1</td>
</tr>
<tr>
<td>Lithium</td>
<td>Trace</td>
</tr>
<tr>
<td>Magnesium</td>
<td>0.393</td>
</tr>
<tr>
<td>Calcium</td>
<td>87.513</td>
</tr>
<tr>
<td>Sulfate</td>
<td>10.692</td>
</tr>
<tr>
<td>Magnesium</td>
<td>0.354</td>
</tr>
<tr>
<td>Iron</td>
<td>0.685</td>
</tr>
<tr>
<td>Alumina</td>
<td>Trace</td>
</tr>
<tr>
<td>Silica</td>
<td>2.464</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>219.495</strong></td>
</tr>
</tbody>
</table>
Te Anau in the Fjords District

This place is situated on the river Te Anau 2½ miles from its mouth, 4½ miles from Te Anau, a seaport town in the Bay of Plenty, on the North East of the North Island. It is easy of access by rail and by boat from Auckland, taking by road. This facility of access is of great importance to a health resort in a new country like New Zealand, and now as much time to be done by coach as by sea.

The scenery around this place is very beautiful, consisting of hills and valleys, densely wooded slopes with the forest joining in great luxuriance. It is an easy day's journey from Auckland.

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>91°F</td>
<td>70°F</td>
<td>5-5620 in.</td>
<td>3-240 in.</td>
</tr>
</tbody>
</table>

There are numerous springs, varying in temperature from 80°F to 139°F. The two inlets are alkaline. They contain the most salt: Chloride of Sodium, Potassium, Sulphate of Soda, and Carbonate of Sodium, Calcium Magnesia, Lime, and Silica Volutum. The total mg. of moisture range from 111 to 586 per gallon. The acid is the content of hydrochloric and sulphuric acid. They are mixed in a case of chemical 1 disproportion.
Whakatane & Tamatea Districts.

Both these districts are inland. Lake Rotoma is some 160 miles due south of the City of Auckland, Whakatane some 50 miles further south west.

These two districts are famed excellence the thermal springs of New Zealand. Here are to be found almost limitless springs hot hot cold, boiling geysers, mud geysers, hot springs, the waters are divided into three classes (a) Pinas, which are geysers continuously intermittently active; (b) Popwhas, or moderate pisas emitting steam, but not throwing up columns of hot water; (c) Wairaki, or columns of hot water, suitable for—

(b) Lake Rotoma District.

The whole of this district may be described as a farming district; it is almost useless for agricultural purposes being covered by a very tough form of scrubby trees.

The New Zealand government has been and is conserving this district for the a public sanatorium for all time to hospitals on the southern end. Tominma is a village on the shore of the lake. Taminma, a hotel has been built, a medical officer (the present one being Dr. Ginders) appointed. This district has been proved to be of great use in cases of consumption, chronic skin, nervous exhaustion, but to be of no use in cases of

Sclerotherapy (Dr. Ginders).
Alturas is some 40 miles from the coast and 990 ft above
the sea level. The atmosphere is drier and more bracing than
that of the coast— in winter considerably colder in summer
hotter but a very pleasant heat.

53.7 \degree F 88.5 \degree F 23.2 \degree F 27.7 \degree F.

24.2 \degree F 65.8 \degree F 66 \degree F 45 \degree F.

Rainfall 50.630 inch: days rain 3.25 in.

Occasionally there is fog and often a heavy dew. Earthquakes are
frequent. In 1895 there was a tremendous earthquake during
which a small lake & the seventeen "Pink Terraces" were de-
stroyed. Mud was scattered for miles around.

Sir James Hector, M.D., has divided these springs into
water which has been analyzed at the Colonial Laboratory
into five classes: (1) Saline containing chiefly soda.
Chloride of Sodium: (2) Alkaline, containing carbonates
+ Bicarbonates of Potassium and Sodium: (3) Alkaline
Silica, containing much silice acid, but changing rapidly
on exposure to the atmosphere, becoming alkaline (4) Sulphate
or Sulphuric, characterized by the presence of sulphuric
Hydrogen + Sulphurous acid; (5) Acidic waters containing
an osm of sulphuric or hydrochloric acids sometimes both.
In addition to these there are saline waters containing
iodine, cold acidulom chalybeate, and saline acidulom chalybeate. I can testify to there being free sulphurised hydrogen in the atmosphere of this district on my arrival at the hotel there being a strong wispy smell in the bedroom allotted to me. I rushed to the window and threw it wide open but found that the smell was strong outside likewise.

The Alkaline Silicon Waters.- "These differ from the ordinary alkaline waters in the presence of silice instead of carbonic acid as a combining agent. They are remarkable from their building extensive mounds of terraces composed of silice deposited by the cooling water, forming as it solidifies a certain amount of granular silice, which is held in mechanical suspension, in this manner the wonderful joint white terraces of Rotomahana. The cones of Wairakei were formed. The clays contain mineral matter - carbonic acid gas. In some cases also sulphurised hydrogen in large quantity. The oxidation of this leads to the formation of sulphuric acid and the liberation of hydrochloric acid. In this way, joining to the acidic waters. When used as baths, they have an unknown alteration action. I am very useful in rheumatic affections, especially in gouty conditions.

Acidic Waters. These carbuncles have been wholly eliminated. The alkaline salts are formed by a mineral acid, either sulphuric or hydrochloric. In some cases the acid is greatly in excess, forming a
bath, which has a powerful action upon the lower portion, is known in the
arrangement of that important organ. In some cases, the presence of sulphuric acid, hydro-sulphuric acid in
large quantities gives these baths great efficacy, with continuous

There are four types of mineral waters in this district:
1) The "Priests Bath": aluminium and hydro-sulphuric acid (reaction acid).
2) "Badome Rachels": saline waters with silicates (reaction alkaline).
3) "Carnarvon Bath": heaping, hydro-alcoholic, with excess of acid (acid reaction).
4) "Turiniche": fatty acid reaction, which turns to

alkaline on boiling.

<table>
<thead>
<tr>
<th>&quot;Priests Bath&quot;</th>
<th>&quot;Badome Rachels&quot;</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sulphate of Soda</td>
<td>1.24</td>
</tr>
<tr>
<td>Potash</td>
<td>Trace</td>
</tr>
<tr>
<td>Lime</td>
<td>0.41</td>
</tr>
<tr>
<td>Magnesium</td>
<td>0.03</td>
</tr>
<tr>
<td>Calcium</td>
<td>0.67</td>
</tr>
<tr>
<td>Iron</td>
<td>1.24</td>
</tr>
<tr>
<td>Sulphuric Acid</td>
<td>2.12</td>
</tr>
<tr>
<td>Hydrosulphate</td>
<td>3.67</td>
</tr>
<tr>
<td>Silica</td>
<td>10.41</td>
</tr>
<tr>
<td>Sulphurated Iron</td>
<td>9.67</td>
</tr>
<tr>
<td>Carbonic Acid</td>
<td>1.96</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>&quot;Carnarvon Bath&quot;</th>
<th>&quot;Turiniche&quot;</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sulphate of Soda</td>
<td>4.43</td>
</tr>
<tr>
<td>Chloride of Potassium</td>
<td>6.47</td>
</tr>
<tr>
<td>Sodium</td>
<td>1.67</td>
</tr>
<tr>
<td>Potassium</td>
<td>1.04</td>
</tr>
<tr>
<td>Calcium</td>
<td>0.22</td>
</tr>
<tr>
<td>Magnesium</td>
<td>1.28</td>
</tr>
<tr>
<td>Alumina</td>
<td>0.62</td>
</tr>
<tr>
<td>Silica</td>
<td>0.22</td>
</tr>
<tr>
<td>Hydrochloric acid</td>
<td>5.93</td>
</tr>
<tr>
<td>Phosphoric Acid</td>
<td>30.51</td>
</tr>
<tr>
<td>Sulphated Iron</td>
<td>4.42</td>
</tr>
<tr>
<td>Carbonic Acid</td>
<td>3.96</td>
</tr>
</tbody>
</table>
The country of around Poimenitei (the village where the baths are at) is mountainous, & the earth is chiefly -
almost -
jasmine everywhere in this district, steam is rising from
the ground. Across the lake is Tichtein where the black
sand gypsies are. Aiwala has said: "The perfection of infurled
inhumaneness is to be found in earth only at Tichtein" the same
wraith remarks. The principal feature is a lake about 60
ft in diameter, in which the boiling mud is thrown about
with great violence, emitting an odour which constitutes
all the smell of Venice. To Venice I have never been but
have been to the vegetation market of Rio de Janeiro after
ashore from Tichtein. Think Tichtein about 1am.
At Nukaneana there is an active geyser (Wakato) which
springs up intermittently sometimes to a height of 60 ft. There
is a curious feature, past here which I do not understand. What is there
are two natural baths within 1/2 mile of each other & one contains boiling
water whereas the in the other little brackish children were swimming
when I went there.

There are also Cold Springs in the Wellington District of the saline
variety but deadly acid. One called Parker contains a large
2:137 parts acid,
amount of hydrochloric; another called Brentia's Tafiko Lake contains
acids of sodium & chlorine. Atiletu Spring is a strong saline water containing
cobalt arsenide, while Atiletu (2) Spring an aerated chalk-
heat water similar to Pyramont, Welbeck, Reoaro Venetia, (Helen).
In the South Island there are Cold Springs at
Hammer Springs in Canterbury Prov. District which are
alkaline in character and give off sulphuric acid hydrogen.
Also at Winklelli Bay, Otago Prov. District, saline in charac-
ter. Prof. Black of New Zealand University gives the following
analysis.

<table>
<thead>
<tr>
<th></th>
<th>39.3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sulphuric Acid (combined)</td>
<td></td>
</tr>
<tr>
<td>Chlorine</td>
<td>112.0</td>
</tr>
<tr>
<td>Magnesia</td>
<td>18.3</td>
</tr>
<tr>
<td>Lime</td>
<td>11.3</td>
</tr>
<tr>
<td>Alkalis</td>
<td>53.0</td>
</tr>
<tr>
<td>Carbonic Acid (combined)</td>
<td>12.6</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>276.7</strong></td>
</tr>
</tbody>
</table>

There are also numerous other springs but they have not been
analyzed as yet. There is such a reputation with increasing
**Meteorological Comparisons**

<table>
<thead>
<tr>
<th>City</th>
<th>Mean Pres.</th>
<th>Temperature in Shade</th>
<th>Rainfall</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>Mean</td>
<td>Min.</td>
</tr>
<tr>
<td>Brisbane</td>
<td>30.090</td>
<td>67.70</td>
<td>99.30</td>
</tr>
<tr>
<td>Perth</td>
<td>30.084</td>
<td>64.00</td>
<td>105.00</td>
</tr>
<tr>
<td>Adelaide</td>
<td>30.106</td>
<td>63.00</td>
<td>106.80</td>
</tr>
<tr>
<td>Sydney</td>
<td>29.864</td>
<td>62.90</td>
<td>97.3</td>
</tr>
<tr>
<td>Auckland</td>
<td>30.071</td>
<td>59.50</td>
<td>82.00</td>
</tr>
<tr>
<td>Melbourne</td>
<td>29.940</td>
<td>57.30</td>
<td>105.00</td>
</tr>
<tr>
<td>Wellington</td>
<td>30.004</td>
<td>53.55</td>
<td>80.00</td>
</tr>
<tr>
<td>Hobart</td>
<td>29.849</td>
<td>55.10</td>
<td>98.90</td>
</tr>
<tr>
<td>Canterbury</td>
<td>30.183</td>
<td>52.95</td>
<td>90.00</td>
</tr>
<tr>
<td>Dunedin</td>
<td>29.976</td>
<td>51.10</td>
<td>86.00</td>
</tr>
<tr>
<td>Dublin</td>
<td>30.015</td>
<td>49.35</td>
<td>78.90</td>
</tr>
<tr>
<td>London</td>
<td>29.744</td>
<td>47.80</td>
<td>92.20</td>
</tr>
<tr>
<td>Quebec</td>
<td>38.16</td>
<td>91.20</td>
<td>28.20</td>
</tr>
</tbody>
</table>

I shall consider Specific febrile or Zymotic Disease, Constitutional Disease & Respiratory Disease; the causes of death. Maori death rate has also taken into account owing to their exclusiveness.

1st. Specific febrile or Zymotic Disease

The population of New Zealand on Dec. 31st (including Maoris) was 607,380

<table>
<thead>
<tr>
<th>Year</th>
<th>Population</th>
</tr>
</thead>
<tbody>
<tr>
<td>1878</td>
<td>607,380</td>
</tr>
<tr>
<td>1879</td>
<td>620,279</td>
</tr>
<tr>
<td>1890</td>
<td>630,781</td>
</tr>
</tbody>
</table>

The death rate from all causes per 1000 living in 1878 was 9.43

<table>
<thead>
<tr>
<th>Year</th>
<th>Death Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>1879</td>
<td>9.40</td>
</tr>
<tr>
<td>1890</td>
<td>9.38</td>
</tr>
</tbody>
</table>

The death rate in the class varies considerably year by year.

(a) Maori Deaths:

The following table shows the diseases in this class which caused the greatest mortality in each of the past seven years:

P.T.O.
<table>
<thead>
<tr>
<th>Disease</th>
<th>1884</th>
<th>1885</th>
<th>1886</th>
<th>1887</th>
<th>1888</th>
<th>1889</th>
<th>1890</th>
</tr>
</thead>
<tbody>
<tr>
<td>Measles</td>
<td>31</td>
<td>1</td>
<td>4.9</td>
<td>2.8</td>
<td>6</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Scarlet Fever</td>
<td>17</td>
<td>12</td>
<td>7</td>
<td>18</td>
<td>21</td>
<td>19</td>
<td>19</td>
</tr>
<tr>
<td>Diphtheria</td>
<td>112</td>
<td>104</td>
<td>78</td>
<td>92</td>
<td>143</td>
<td>118</td>
<td>116</td>
</tr>
<tr>
<td>Whooping Cough</td>
<td>167</td>
<td>91</td>
<td>132</td>
<td>138</td>
<td>72</td>
<td>19</td>
<td>82</td>
</tr>
<tr>
<td>Diarrhoeal Disease</td>
<td>208</td>
<td>399</td>
<td>1455</td>
<td>475</td>
<td>214</td>
<td>335</td>
<td>290</td>
</tr>
<tr>
<td>Infant Fever</td>
<td>104</td>
<td>118</td>
<td>123</td>
<td>158</td>
<td>130</td>
<td>110</td>
<td>145</td>
</tr>
<tr>
<td>Puerperal Fever</td>
<td>20</td>
<td>48</td>
<td>33</td>
<td>24</td>
<td>39</td>
<td>25</td>
<td>19</td>
</tr>
</tbody>
</table>

**Influenza**

The number of deaths registered as having been caused by influenza till 1890 is small, and has been for some years as a cause of death. It will be noticed that Diphtheria as a cause of death was more prevalent in 1888, 1889 and 1890 than the four years preceding.

The rates of mortality from this disease in every 10,000 persons living in the several provincial districts were in the last three years as follows:

<table>
<thead>
<tr>
<th>District</th>
<th>1887</th>
<th>1888</th>
<th>1889</th>
<th>1890</th>
</tr>
</thead>
<tbody>
<tr>
<td>Auckland</td>
<td>0.7</td>
<td>1.3</td>
<td>0.6</td>
<td></td>
</tr>
<tr>
<td>Hawke's Bay</td>
<td>0.8</td>
<td>2.7</td>
<td>1.9</td>
<td></td>
</tr>
<tr>
<td>Taranaki</td>
<td>1.1</td>
<td>10.4</td>
<td>6.2</td>
<td>4.5</td>
</tr>
<tr>
<td>Wellington</td>
<td>1.0</td>
<td>2.3</td>
<td>1.5</td>
<td>0.7</td>
</tr>
<tr>
<td>Marlborough</td>
<td>3.5</td>
<td>1.7</td>
<td>3.9</td>
<td></td>
</tr>
<tr>
<td>Nelson</td>
<td>2.6</td>
<td>7.3</td>
<td>4.3</td>
<td></td>
</tr>
<tr>
<td>Waitaki</td>
<td>0.0</td>
<td>0.0</td>
<td>0.4</td>
<td>0.8</td>
</tr>
<tr>
<td>Canterbury</td>
<td>4.0</td>
<td>3.7</td>
<td>2.1</td>
<td></td>
</tr>
<tr>
<td>Otago</td>
<td>0.5</td>
<td>0.5</td>
<td>2.1</td>
<td></td>
</tr>
</tbody>
</table>
Ontario Fever:

The deaths from typhoid fever, which numbered 138 in 1887, were only 130 in 1888, 218 in 1889, and 190 in 1890. The following table shows the number of

<table>
<thead>
<tr>
<th>Provinicial district</th>
<th>1887</th>
<th>1888</th>
<th>1889</th>
<th>1890</th>
</tr>
</thead>
<tbody>
<tr>
<td>Auckland</td>
<td>4.0</td>
<td>4.1</td>
<td>1.8</td>
<td>3.7</td>
</tr>
<tr>
<td>Hawkes Bay</td>
<td>5.1</td>
<td>2.7</td>
<td>4.9</td>
<td>4.8</td>
</tr>
<tr>
<td>Toranelli (1 death)</td>
<td>2.6</td>
<td>2.0</td>
<td>2.0</td>
<td></td>
</tr>
<tr>
<td>Wellington</td>
<td>3.6</td>
<td>2.1</td>
<td>2.4</td>
<td>2.3</td>
</tr>
<tr>
<td>Marlborough</td>
<td>2.6</td>
<td>1.7</td>
<td>3.0</td>
<td>4.0</td>
</tr>
<tr>
<td>Nelson</td>
<td>0.6</td>
<td>1.3</td>
<td>1.3</td>
<td>1.2</td>
</tr>
<tr>
<td>Waitangi</td>
<td>0.0</td>
<td>1.0</td>
<td>1.0</td>
<td>1.0</td>
</tr>
<tr>
<td>Canterbury</td>
<td>2.9</td>
<td>1.3</td>
<td>3.10</td>
<td>3.19</td>
</tr>
<tr>
<td>Clago</td>
<td>1.2</td>
<td>1.4</td>
<td>0.7</td>
<td>0.9</td>
</tr>
</tbody>
</table>

Deaths from this disease are unfortunately higher in the

Australia colonies than in England

<table>
<thead>
<tr>
<th>England</th>
<th>1882</th>
<th>1.69</th>
</tr>
</thead>
<tbody>
<tr>
<td>New Zealand average</td>
<td>1888-1889-1890</td>
<td>2.13</td>
</tr>
<tr>
<td>Queensland</td>
<td>1888</td>
<td>4.32</td>
</tr>
<tr>
<td>South Wales</td>
<td>1889</td>
<td>4.08</td>
</tr>
<tr>
<td>Victoria</td>
<td>1889</td>
<td>5.09</td>
</tr>
<tr>
<td>South Australia</td>
<td>1889</td>
<td>4.26</td>
</tr>
<tr>
<td>Tasmania</td>
<td>1889</td>
<td>7.59</td>
</tr>
</tbody>
</table>
(2) **Diarrhoeal Disease.**

Sulphate of Magnesia were included but their proportion to simple diarrhoea is very small.

On referring to the table in the top of page 26 it will be noticed that the number of deaths from these causes varies greatly, and it has been noticed that the difference in temperature coincident with it. The following statement shows how the mortality from Diarrhoeal Disease rises and falls with the temperature. The mean maximum temperatures in the months January, February, March is given.

<table>
<thead>
<tr>
<th>Year</th>
<th>City</th>
<th>Mean Max Temp</th>
<th>Deaths from Diarrhoea</th>
<th>Per 10,000 Population</th>
</tr>
</thead>
<tbody>
<tr>
<td>1856</td>
<td>Auckland</td>
<td>74.4°F</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Wellington</td>
<td>69.7°F</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Lincoln</td>
<td>70.4°F</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Dunedin</td>
<td>62.4°F</td>
<td>Average of Means 69.2°F</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Death from Diarrhoea 2.5</td>
<td></td>
</tr>
<tr>
<td>1857</td>
<td>Auckland</td>
<td>76.5°F</td>
<td>Death from Diarrhoea 4.75</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Wellington</td>
<td>71.8°F</td>
<td>Per 10,000 Population 7.96</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Lincoln</td>
<td>74.2°F</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Dunedin</td>
<td>71.7°F</td>
<td>Average of Means 73.6°F</td>
<td></td>
</tr>
<tr>
<td>1858</td>
<td>Auckland</td>
<td>70.7°F</td>
<td>Death from Diarrhoea 2.14</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Wellington</td>
<td>67.0°F</td>
<td>Per 10,000 Population 3.53</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Lincoln</td>
<td>71.0°F</td>
<td>Average of means 68.73°F</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Dunedin</td>
<td>66.1°F</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
1889
Auckland mean max. 74° 44 F.
Wellington 68° 08  
Lincoln 72° 47  
Dunedin 67° 83  
Deaths from Tubercular 355
Population per 10,000 living 5.78
Average of means 70° 87 F.

1890
Auckland mean max. 73° 6 F.
Wellington 69° 3  
Lincoln 70° 26  
Dunedin 68° 1  
Deaths from Typhoid 250
Population per 10,000 living 3.94
Average of means 70° 29 F.

2nd Constitutional Disease

Acute Rhenemation, Rheumatism Ract

From the above diseases there were 49 registered as the cause of death in 1889 being at the rate of .78 per 10,000 living.

In 1890 there were 56 deaths giving a rate of .88 per 10,000 living.

Rickets, Tuberculosis, Tubercular Pneumonia, Tubercular meningitis, Acute hydrocephalus, "Other forms of Tuberculous, Osteo-

From the above diseases there were 154 registered as the cause of death in 1889 being at the rate of 2.148 per 10,000 living.
In 1870 there were 132 deaths giving a rate of 2.09

Cancer:

There has been for several years with few exceptions a gradual increase in the number of cases of death certified as cancer. This has been mostly explained by the fact that diagnosis of this disease is more accurate now than it was formerly, especially in the cases of internal cancer. At the same time, it is not difficult to see that the increase is partly or wholly due to the more complete registration of deaths.

<table>
<thead>
<tr>
<th>Year</th>
<th>New Zealand</th>
<th>England</th>
</tr>
</thead>
<tbody>
<tr>
<td>1880</td>
<td>2.80</td>
<td>5.14</td>
</tr>
<tr>
<td>1881</td>
<td>2.69</td>
<td>5.20</td>
</tr>
<tr>
<td>1882</td>
<td>2.89</td>
<td>5.32</td>
</tr>
<tr>
<td>1883</td>
<td>2.99</td>
<td>5.46</td>
</tr>
<tr>
<td>1884</td>
<td>3.46</td>
<td>5.60</td>
</tr>
<tr>
<td>1885</td>
<td>3.13</td>
<td>5.56</td>
</tr>
<tr>
<td>1886</td>
<td>3.68</td>
<td>5.83</td>
</tr>
<tr>
<td>1887</td>
<td>3.99</td>
<td>6.06</td>
</tr>
<tr>
<td>1888</td>
<td>4.34</td>
<td>6.10</td>
</tr>
<tr>
<td>1889</td>
<td>4.24</td>
<td></td>
</tr>
<tr>
<td>1890</td>
<td>4.67</td>
<td></td>
</tr>
</tbody>
</table>
Phthisis

This disease causes more deaths than any other disease; consequently the consideration of the climatic influence of any country is of little value, looking off or retarding the progress of this disease of great interest. There were 476 cases of death caused by phthisis recorded in 1885; 499 in 1889, 520 in 1890.

In 1889 the proportion for 10,000 living was 8.13. In 1890 it was 8.2.

The death-rate from phthisis in 1889 though higher than in 1888 was below that in either of the other Australian Colonies except Tasmania & not much more than half the rate that obtains in England, where the rate has in some years considerably decreased. The death-rate from phthisis in all these colonies are materially increased by the deaths of persons who have arrived in a diseased condition, constitutionally predisposed thither. There is, however no reason to suppose that the rate is more affected by this cause in the other colonies than in New Zealand, consequently the lower rate in this colony may be accepted as an indication of the superiority of its climate for withstanding the
The development of pathological tendencies.

<table>
<thead>
<tr>
<th></th>
<th>1887</th>
<th></th>
<th>1888</th>
<th></th>
<th>1889</th>
<th></th>
<th>1889</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>10,000</td>
<td></td>
<td></td>
<td></td>
<td>10,000</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>persons living</td>
<td></td>
<td></td>
<td></td>
<td>persons living</td>
<td></td>
<td></td>
</tr>
<tr>
<td>New Zealand</td>
<td>7.86</td>
<td>1887</td>
<td>8.13</td>
<td>1888</td>
<td>9.02</td>
<td>1889</td>
<td>13.82</td>
<td>1890</td>
</tr>
<tr>
<td>Queensland</td>
<td>12.43</td>
<td>1887</td>
<td>13.04</td>
<td>1888</td>
<td>9.82</td>
<td>1889</td>
<td>9.32</td>
<td>1890</td>
</tr>
<tr>
<td>New South Wales</td>
<td>9.56</td>
<td>1887</td>
<td>14.39</td>
<td>1888</td>
<td>9.16</td>
<td>1889</td>
<td>10.69</td>
<td>1890</td>
</tr>
<tr>
<td>Victoria</td>
<td>15.26</td>
<td>1887</td>
<td>11.74</td>
<td>1888</td>
<td>9.09</td>
<td>1889</td>
<td>9.09</td>
<td>1890</td>
</tr>
<tr>
<td>South Australia</td>
<td>8.01</td>
<td>1888</td>
<td>8.13</td>
<td>1889</td>
<td>8.13</td>
<td>1890</td>
<td>8.13</td>
<td>1891</td>
</tr>
<tr>
<td>England</td>
<td>15.91</td>
<td>1887</td>
<td>15.41</td>
<td>1888</td>
<td>15.41</td>
<td>1889</td>
<td>15.41</td>
<td>1890</td>
</tr>
</tbody>
</table>

The death rate of England from phthisis would be much higher if all those who contracted the disease had died there instead of going abroad dying there e.g. South Africa, Australasian colonies etc.

In 1888 if those who died from phthisis the proportion of Colonial born was 30 percent, in 1889 the proportion was 29 percent.

7.82 percent had lived in the colony under 3 years many of the others were in all probability constitutionally predisposed. In 1889 only 4.32 per 1000 dying of death from phthisis were Colonial born. In 1890 it was 4.40.
The remaining deaths gave a proportion in 1889 of 12.79 in every 10,000 persons born outside of the colony being nearly 3 per 10,000 less than England. Improved means of hygiene has been instituted from London & elsewhere by the highest bodies & is in a direction to reduce those being over 10,000. This is a healthy country.

Diseases of Respiratory System.

Diseases of this system caused 689 deaths in 1889 being at the rate of 11.1 per 10,000 living & in 1890 caused 756 deaths being at the rate of 11.9 per 10,000 living. In 1898 the no. of deaths was 138 with a rate of 12.14 per 10,000 living in New Zealand in that year. The average for three years was 11.71 per 10,000 living.

In this system have worked out the three principal causes of death viz. Croup, Bronchitis, Pneumonia.

<table>
<thead>
<tr>
<th></th>
<th>1889</th>
<th>1890</th>
</tr>
</thead>
<tbody>
<tr>
<td>Croup</td>
<td>68</td>
<td>42</td>
</tr>
<tr>
<td>Bronchitis</td>
<td>275</td>
<td>283</td>
</tr>
<tr>
<td>Pneumonia</td>
<td>229</td>
<td>244</td>
</tr>
</tbody>
</table>

The death rate for 10,000 living caused by Croup is in the different districts throughs is given in next page.
<table>
<thead>
<tr>
<th>Area</th>
<th>Death Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Auckland Borough</td>
<td>0.51</td>
</tr>
<tr>
<td>Taranaki Prov. Dist.</td>
<td>1.5</td>
</tr>
<tr>
<td>Hawke's Bay</td>
<td>0.89</td>
</tr>
<tr>
<td>Wellington Borough</td>
<td>0.28</td>
</tr>
<tr>
<td>Marlborough Prov. Dist.</td>
<td>0.4</td>
</tr>
<tr>
<td>Nelson</td>
<td>0.3</td>
</tr>
<tr>
<td>Westland (Vegut district)</td>
<td>3.83</td>
</tr>
<tr>
<td>Canterbury</td>
<td>1.36</td>
</tr>
<tr>
<td>Christchurch Borough (Very flat, relaxing but dry)</td>
<td>2.64</td>
</tr>
<tr>
<td>Otago Provincial Dist.</td>
<td>0.74</td>
</tr>
<tr>
<td>Dunedin Borough</td>
<td>0.0</td>
</tr>
</tbody>
</table>

Westland Prov. Dist. & Christchurch Borough have the highest death rate. Westland has five times the amount of rain as Christchurch, but climate is equable. Christchurch has very little rain but changeable climate. From this it is clear that a damp climate & a changeable climate are both predisposing toBronchitis.

This disease causes more deaths than any other in the Respiratory system. In 1889 the death rate from this cause was
<table>
<thead>
<tr>
<th>Province or District</th>
<th>Average</th>
</tr>
</thead>
<tbody>
<tr>
<td>Auckland Prov. Dist. (including City of Auckland)</td>
<td>6.4</td>
</tr>
<tr>
<td>Auckland Boro.</td>
<td>7.31</td>
</tr>
<tr>
<td>Taumaruiki Prov. Dist.</td>
<td>4.53</td>
</tr>
<tr>
<td>Hawkes Bay</td>
<td>3.33</td>
</tr>
<tr>
<td>Wellington (including City of Wellington)</td>
<td>7.3</td>
</tr>
<tr>
<td>Wellington Boro.</td>
<td>5.99</td>
</tr>
<tr>
<td>Marlborough Prov. Dist.</td>
<td>3.78</td>
</tr>
<tr>
<td>Nelson</td>
<td>7.4</td>
</tr>
<tr>
<td>Westland</td>
<td>6.3</td>
</tr>
<tr>
<td>Christchurch (including Christchurch Boro.)</td>
<td>7.1</td>
</tr>
<tr>
<td>Christchurch Boro.</td>
<td>5.01</td>
</tr>
<tr>
<td>Otago Prov. Dist. (including City of Dunedin)</td>
<td>5.7</td>
</tr>
<tr>
<td>Dunedin Boro.</td>
<td>5.49</td>
</tr>
</tbody>
</table>

Handwritten note:

Hand this very Province has last 1000 deaths for 10,000 living. The climate (Balmain is the chief town with Bridge) is warm and dry. Auckland is warm and moist. But a great many inhabitants are sent there. There are a good number of people in declining years always settling there from England or who cannot stand the English climate. The same may said of Nelson. The South Island (excluding Marlborough) admits has a higher death rate than the North Islands from bronchitis.
Pneumonia

This disease may be looked upon as accidental in a great degree but stout persons with weak chests are predisposed to it. It is more frequent in a cold dry climate than a warm one. In New Zealand the death rate for 1000 living was nearly twice the amount in the North Island as that of the South Island.

Auckland & Wellington Areas. 3.89
Christchurch & Dunedin. (S. O. 2) 6.205

The Provincial Districts, Hawke's Bay, which has the lowest rate in the South Island stands highest. The climate of this district is almost all one could wish, dry, warm, salubrious. I should like to have mentioned formerly that cases of deaths were cases of chronic Pneumonia this known. Would not it do.

On the next page I give a chart of the death rate for 1000 living of the diseases I have mentioned in the different districts & boroughs.
Throughout the year there is less in the way of accidents, the table of events will be found on page 38.

<table>
<thead>
<tr>
<th>Borough</th>
<th>1514</th>
<th>21.84</th>
<th>15.47</th>
<th>9.36</th>
<th>18.0</th>
<th>12.41</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1) Auckland</td>
<td>5.8</td>
<td>10.5</td>
<td>5.71</td>
<td>4.26</td>
<td>8.1</td>
<td>4.53</td>
</tr>
<tr>
<td>(2) Hamilton</td>
<td>9.34</td>
<td>11.34</td>
<td>9.76</td>
<td>6.00</td>
<td>10.54</td>
<td>7.88</td>
</tr>
<tr>
<td>(3) Christchurch</td>
<td>20.53</td>
<td>24.37</td>
<td>16.25</td>
<td>30.71</td>
<td>22.46</td>
<td>23.48</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Borough</th>
<th>13.1</th>
<th>11.04</th>
<th>14.36</th>
<th>16.88</th>
<th>12.07</th>
<th>15.62</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1) Otago</td>
<td>1.25</td>
<td>8.1</td>
<td>8.3</td>
<td>6.65</td>
<td>7.03</td>
<td>3.74</td>
</tr>
<tr>
<td>(2) Invercargill</td>
<td>2.32</td>
<td>4.22</td>
<td>2.87</td>
<td>4.69</td>
<td>3.37</td>
<td>3.78</td>
</tr>
<tr>
<td>(3) Wellington</td>
<td>4.22</td>
<td>6.18</td>
<td>4.9</td>
<td>10.49</td>
<td>5.7</td>
<td>7.37</td>
</tr>
<tr>
<td>(4) Dunedin</td>
<td>11.00</td>
<td>11.31</td>
<td>6.69</td>
<td>12.79</td>
<td>11.15</td>
<td>9.74</td>
</tr>
</tbody>
</table>

The South Island Boroughs (Christchurch & Dunedin) have the advantage in a lower death rate than the North Island Boroughs (Auckland & Wellington) in Zymotic Diarrhea.

The North Island has the advantage in Constitutional Diseases as the South Island but not so much as one would expect. This is due to the shorter distance between the two islands.

In Respiratory Diseases the South Island Boroughs have a distinct advantage over the North ones.
<table>
<thead>
<tr>
<th></th>
<th>Auckland</th>
<th>Taranaki</th>
<th>Hawke's Bay</th>
<th>Wellington</th>
<th>Nelson</th>
<th>Marlborough</th>
<th>Canterbury</th>
<th>Otago</th>
<th>South Island</th>
<th>South Island</th>
</tr>
</thead>
<tbody>
<tr>
<td>I. Principal 5.25a (a)</td>
<td>15.60</td>
<td>21.4</td>
<td>17.80</td>
<td>18.3</td>
<td>17.45</td>
<td>12.0</td>
<td>9.65</td>
<td></td>
<td>21.45</td>
<td>11.10</td>
</tr>
<tr>
<td>(1) Intramural (2)</td>
<td>5.75</td>
<td>15.6</td>
<td>7.15</td>
<td>7.5</td>
<td>6.8</td>
<td>7.2</td>
<td>6.35</td>
<td>8.4</td>
<td>5.15</td>
<td>9.00</td>
</tr>
<tr>
<td>(3) Extremal</td>
<td>9.85</td>
<td>5.8</td>
<td>10.65</td>
<td>10.8</td>
<td>10.65</td>
<td>4.8</td>
<td>3.3</td>
<td>12.95</td>
<td>5.95</td>
<td>9.00</td>
</tr>
<tr>
<td>II. Conspicuous 5.25b (a)</td>
<td>17.37</td>
<td>14.65</td>
<td>18.6</td>
<td>14.55</td>
<td>15.2</td>
<td>14.55</td>
<td>20.3</td>
<td>16.75</td>
<td>18.86</td>
<td>16.29</td>
</tr>
<tr>
<td>(1) Tuberculosis (2)</td>
<td>1.00</td>
<td>1.00</td>
<td>9.64</td>
<td>1.2</td>
<td>3.15</td>
<td>-1.0</td>
<td>8.0</td>
<td></td>
<td>8.82</td>
<td>7.13</td>
</tr>
<tr>
<td>(3) Non-tub. Tuberculosis</td>
<td>2.45</td>
<td>2.45</td>
<td>3.54</td>
<td>3.125</td>
<td>2.00</td>
<td>2.45</td>
<td>3.25</td>
<td>3.25</td>
<td>2.72</td>
<td>2.776</td>
</tr>
<tr>
<td>(3) Cancer</td>
<td>4.2</td>
<td>4.15</td>
<td>4.2</td>
<td>4.0</td>
<td>3.144</td>
<td>7.15</td>
<td>2.25</td>
<td>3.76</td>
<td>4.03</td>
<td>14.9</td>
</tr>
<tr>
<td>(3) Phthisis</td>
<td>8.7</td>
<td>7.75</td>
<td>10.05</td>
<td>7.65</td>
<td>4.95</td>
<td>9.0</td>
<td>8.25</td>
<td>8.25</td>
<td>8.53</td>
<td>7.65</td>
</tr>
<tr>
<td>III. Accessory 5.25c (a)</td>
<td>13.9</td>
<td>11.15</td>
<td>11.6</td>
<td>13.15</td>
<td>10.95</td>
<td>16.1</td>
<td>19.79</td>
<td>15.84</td>
<td>15.15</td>
<td>12.45</td>
</tr>
<tr>
<td>(1) Bronchitis (2)</td>
<td>1.76</td>
<td>1.9</td>
<td>2.95</td>
<td>4.15</td>
<td>3.3</td>
<td>3.905</td>
<td>1.441</td>
<td>1.79</td>
<td>8.76</td>
<td>1.37</td>
</tr>
<tr>
<td>(3) Bronchitis</td>
<td>6.4</td>
<td>4.535</td>
<td>3.33</td>
<td>7.23</td>
<td>2.78</td>
<td>7.35</td>
<td>6.25</td>
<td>7.1</td>
<td>5.7</td>
<td>5.998</td>
</tr>
<tr>
<td>(2) Pneumonia</td>
<td>5.1</td>
<td>4.87</td>
<td>5.8</td>
<td>3.89</td>
<td>3.665</td>
<td>5.45</td>
<td>5.95</td>
<td>12.9</td>
<td>5.30</td>
<td>5.04</td>
</tr>
</tbody>
</table>
from my reading of general knowledge I have come to the
conclusion that the North Island is much more
suitable for persons suffering from a constitutional
disorder, or disease of the respiratory system than the
South Island. The meteorological conditions are better
and the death rate from it.
In the visceral State the North Island looks much
worse than the South, but this is due to there being an
epidemic of whooping cough & diphtheria in the
Provincial District of the I. of Tarawera in the north Island

Enteric fever causes a great no. of deaths in proportion
to population to what it does in England but the
wonder is that it does not cause more considering that
New Zealand has not been colonized 65 years yet.
Dunedin in 1869 had not a single death from this
cause but Wellington is high; in 1890 it was at a
rate of 5.5 per 10000. Auckland 43. In 1889
Wellington was 3.3 & Auckland 1.32

Vital Statistics of New Zealand compared with the
other Australasian Colonies and England.
Death Rate of Children under 5 years in New Zealand, Australia and England.

<table>
<thead>
<tr>
<th>Country</th>
<th>New Zealand</th>
<th>South Africa</th>
<th>Victoria</th>
<th>England</th>
</tr>
</thead>
<tbody>
<tr>
<td>Projection</td>
<td>121.37</td>
<td>173.77</td>
<td>178.68</td>
<td>233.50</td>
</tr>
<tr>
<td>born who die under 5 years.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Consequently the average number of children in each family living to the age of 5 years would be as follows:

<table>
<thead>
<tr>
<th>Country</th>
<th>New Zealand</th>
<th>South Africa</th>
<th>Victoria</th>
<th>England</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>4.65</td>
<td>3.87</td>
<td>3.53</td>
<td>3.19</td>
</tr>
</tbody>
</table>

For every 100 families there would be the following number of children who had survived the 5th year of age.

The leading position of New Zealand is due to much lower rate of mortality among infants under one year.

The total number of deaths in 1889 were 3,772 being equivalent to a rate of 9.401 in 1890 - 3,994 being 9.50 per 1,000 living.

The death rate in New Zealand contrasts very strikingly with those in the other Australian colonies with Great Britain, and may be taken as evidence of greater salubrity of the climate of this colony. The following table gives the death rate for several years in the several countries mentioned.
<table>
<thead>
<tr>
<th></th>
<th>1885</th>
<th>1886</th>
<th>1887</th>
<th>1888</th>
<th>1889</th>
<th>1890</th>
</tr>
</thead>
<tbody>
<tr>
<td>Benaguela</td>
<td>10.76</td>
<td>10.54</td>
<td>10.29</td>
<td>9.43</td>
<td>9.40</td>
<td>9.50</td>
</tr>
<tr>
<td>South Australia</td>
<td>12.48</td>
<td>13.38</td>
<td>12.77</td>
<td>12.09</td>
<td>10.98</td>
<td></td>
</tr>
<tr>
<td>Tasmania</td>
<td>15.40</td>
<td>14.58</td>
<td>15.40</td>
<td>14.11</td>
<td>14.10</td>
<td></td>
</tr>
<tr>
<td>New South Wales</td>
<td>16.41</td>
<td>14.89</td>
<td>13.15</td>
<td>13.54</td>
<td>13.42</td>
<td></td>
</tr>
<tr>
<td>Victoria</td>
<td>14.98</td>
<td>15.15</td>
<td>15.70</td>
<td>15.34</td>
<td>17.54</td>
<td></td>
</tr>
<tr>
<td>Queensland</td>
<td>19.58</td>
<td>17.29</td>
<td>14.56</td>
<td>14.66</td>
<td>15.44</td>
<td></td>
</tr>
<tr>
<td>Western Australia</td>
<td>17.61</td>
<td>21.56</td>
<td>14.88</td>
<td>15.91</td>
<td>14.19</td>
<td></td>
</tr>
<tr>
<td>Great Britain</td>
<td>19.08</td>
<td>15.85</td>
<td>13.75</td>
<td>17.7</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

In the above, New Zealand stands out as preeminently the healthiest country of the group. But it is but little one has to remember that the New Zealand population is composed of a greater proportion of young middle-aged persons to England and some of the older colonies. The population of England is stable as it is taken as the standard. The no. of people at different ages was found at the census of 1881 for the different colonies then adjusted their proportion to the English one. This method of calculating the death rate for a colony is termed "Hooper's method." (The Government statistic of Victoria).

1886.

<table>
<thead>
<tr>
<th>N.Z.</th>
<th>Victoria</th>
<th>N.S.W.</th>
<th>South Australia</th>
<th>Tasmania</th>
<th>Queensland</th>
<th>Western Australia</th>
<th>Great Britain</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ordinary</td>
<td>10.54</td>
<td>15.15</td>
<td>14.89</td>
<td>13.38</td>
<td>15.40</td>
<td>17.29</td>
<td>19.28</td>
</tr>
<tr>
<td>Adjusted age</td>
<td>12.82</td>
<td>17.00</td>
<td>17.22</td>
<td>19.17</td>
<td>12.33</td>
<td>19.00</td>
<td>19.28</td>
</tr>
<tr>
<td>575 only</td>
<td>11.29</td>
<td>15.04</td>
<td>15.16</td>
<td>17.17</td>
<td>10.32</td>
<td>17.22</td>
<td>17.17</td>
</tr>
</tbody>
</table>
In the preceding table it will be noticed that returning the death rate of Tasmania in the ordinary way it comes out higher than New Zealand, but South Wales, Victoria, and South Australia. This is due to the predominance of very old people in that colony. Its population consists of a greater proportion of middle-aged and old persons to the colony.

When the population of the colonies are adjusted to the English standard then Tasmania stands next to New Zealand but when they are adjusted to the age 75 years only then Tasmania has a lower death rate than New Zealand.

The great cause of the lower death rate of New Zealand & Tasmania is the lower mortality in children under five years of age.

<table>
<thead>
<tr>
<th></th>
<th>N.Z.</th>
<th>Queensland</th>
<th>South Wales</th>
<th>Victoria</th>
<th>South Eastern Tasmania</th>
<th>England</th>
</tr>
</thead>
<tbody>
<tr>
<td>Under 5 years</td>
<td>28.52</td>
<td>49.44</td>
<td>42.46</td>
<td>44.51</td>
<td>40.09</td>
<td>33.50</td>
</tr>
<tr>
<td>5-14 years</td>
<td>14.08</td>
<td>26.48</td>
<td>14.29</td>
<td>13.62</td>
<td>13.06</td>
<td>15.10</td>
</tr>
<tr>
<td>15-44 years</td>
<td>13.94</td>
<td>25.26</td>
<td>19.21</td>
<td>19.89</td>
<td>17.24</td>
<td>15.51</td>
</tr>
<tr>
<td>45-64 years</td>
<td>34.64</td>
<td>47.14</td>
<td>45.08</td>
<td>45.55</td>
<td>34.30</td>
<td>31.61</td>
</tr>
<tr>
<td>65-74 years</td>
<td>46.47</td>
<td>50.63</td>
<td>59.26</td>
<td>55.84</td>
<td>56.34</td>
<td>64.36</td>
</tr>
<tr>
<td>75 and upwards</td>
<td>123.16</td>
<td>133.57</td>
<td>159.40</td>
<td>152.18</td>
<td>135.26</td>
<td>160.76</td>
</tr>
</tbody>
</table>

This above table shows where the lower death rate is mainly owing the lives of children under 5 years of age.
Conclusion

I commenced this subject because I found from my position as ship surgeon in one of the British & Albion Company's Royal Mail Steamers (by the Cape of Good Hope route) that many of the passengers going out to the colonies to settle, in account of bad health, were going to parts entirely unsuitable — e.g. a case of phthisis going to Melbourne a district where the temp. often drops 40° in a couple of hours when they have hot "North Winters" & cold Southerly "Frosties." If had a patient before me with phthisis last in his low last stage for then they have home to be buried at sea) I recommended a colonizer should advise him to go to the North Island of New Zealand especially to the North-east & north of it. Or to the secondly to Tasmania or thirdly to (1) South Australia if he wanted a dry warm climate & (2) New South Wales if a warm moist climate was required.

Jno. W. Pale M.B., C.B.